

**Aristotle as Portfolio Manager: Begging the Question in Stock Pricing**  
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The advancement of learning in all fields of knowledge proceeds by genuine method. Science is a way of knowing. Science is logic, experiment, and causality in contrast to teleology. Philosophy is another way of knowing. In all ways of knowing, genuine method proceeds from the better known to the lesser known, from the more clear to the less clear, or from the more certain to the less certain. Genuine method proceeds not from the lesser known to the better known and not from the known to the *equally* known.

In logic, the science of reasoning, genuine method is violated in the fallacy of reasoning named “begging the question” by Aristotle. This fallacy goes by other names including vicious circle and circular reasoning. The fallacy is fatal because it ends an argument.

In math, circular reasoning can be vicious or virtuous. An example from beginning algebra may help to illustrate a vicious circle. The perimeter,  $P$ , of a rectangle is defined to be equal to twice the width,  $W$ , plus twice the length,  $L$ . In terms of the perimeter, what are the dimensions of a rectangle that is twice as long as it is wide?

*Step 1.* Rearrange the general formula for perimeter to isolate  $W$ .

$$P = 2W + 2L$$

$$2W = P - 2L$$

$$W = (P - 2L)/2$$

*Step 2.* State the specific case.

$$L = 2W$$

*Step 3.* Insert the specific case into the general formula.

$$W = [P - 2(2W)]/2$$

$$W = (P - 4W)/2$$

*Step 4.* Isolate the unknown variable,  $W$ , on the left-hand side of the equation.

$$2W = P - 4W$$

$$6W = P$$

$$W = P/6$$

*Step 5.* Solve for the unknown value of  $W$  in an instance of the specific case.

Given:  $P = 57$ .

Therefore:  $W = P/6 = 57/6 = 9.5$ , and  $L = 2W = 2(9.5) = 19$ .

It is not possible to solve the equation for the unknown variable without first isolating it, by convention, on the left-hand side. This isolation prevents vicious circular reasoning.

In inferential statistics and introductory econometrics (a method of causal inference applied to economics), vicious circular reasoning can be found in something called the simultaneity, and more particularly, in a special type of single-equation simultaneity that can be called circular simultaneity. In a circular simultaneity, there is a direct linear relationship between the left-hand side of an inferential model equation and a variable on the right-hand side of the equation, either explicitly specified or embedded.

Return on investment is a derived variable. Return cannot be observed directly; rather, it must be calculated from other variables. The operational definition of total return entails five variables: beginning price, ending price, beginning shares, ending shares, and cash dividends. In financial asset pricing models, including stock-portfolio pricing models, return is the explained variable on the left-hand side of the equation. Therefore, any scientific stock pricing model of return ( $R$ ) cannot validly specify an explanatory factor on the right-hand side that entails the price ( $P$ ), dividends ( $D$ ), or shares ( $S$ ) component of the definition of return. If  $P$ ,  $D$ , or  $S$  appears on the right-hand side of an econometric model of  $R$ , then  $P$ ,  $D$ , or  $S$  produces a circular simultaneity. Such a stock pricing model is not scientific; rather, it is pseudo-scientific. It is a concealed form of market timing.

Circular-simultaneity models are neither scientifically nor logically valid. They are logically meaningless, non-interpretable, and indeterminate [Notes 1 and 2]. The most common occurrences of circular- simultaneity models in the finance literature are:

1. Size (market capitalization or market value,  $P$  multiplied by  $S$ ).
2. Price yield and its inverse ( $E/P$ ,  $P/E$ ,  $B/P$ , book value-to-market value).
3. Cash dividends and dividend yield ( $D/P$ ).
4. Stock splits in event studies ( $S$ , the number of shares outstanding).

The Three-Factor Model includes a market-related, a size-related, and a value-related risk factor. The size- and value-related risk factors are fatal fallacies, regardless of the data used to test and estimate the stock-portfolio pricing model by any scientific method. The Three-Factor Model risk factors are zero net investment long/short index portfolios. It is based on quantitative analysis, which can be valid if the so-called risk factors are not instances of circular simultaneity.

Investment strategies based on circular-simultaneity models can not be truly said to be designed to produce superior or premium expected returns higher than conventional benchmarks for the broad well-diversified market portfolio. Investors are harmed to the extent of asset management fees and advisor fees for such financial products in excess of fees for passive no-load broad market index funds. The cost to investors worldwide is conservatively estimated to exceed \$1 billion each year. What would Aristotle do?

*Note 1.* Coleman, R.D., "Asset Pricing Simultaneity, Three-Factor Model and Cost Analysis", *Indian Journal of Economics and Business*, Vol. 4, No. 1, (June 2005), 73-94. The theme of this issue is finance and financial reform. View TOC at <[www.ijeb.com](http://www.ijeb.com)>.

*Note 2.* Coleman, R.D., "Asset Pricing Simultaneities: Phases and Patterns", *Annals of Economics and Finance*, Vol. 7, No. 1, (May 2006), 49-76. View and download article for free at <<http://www.aecon.net/contents.htm>>.

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